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Life in the Fast Lane: A Pre- and Post-test Comparison of MBA Performance in Accelerated versus Traditional Core Microeconomics Classes

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ABSTRACT

This study investigates the relationship between student achievement among MBAs in their core microeconomics class and course length using a pre-test and post-test design to capture achievement. A reduced form production function is estimated where post-test scores are a function of pre-test and GMAT scores, class work, and course length. The analysis indicates that student achievement in the accelerated, eight-week classes is lower than that in the traditional, 16-week sessions. While statistically significant, the magnitude of the reduction is small, less than one question on the 32-item instrument. Thus, the practical consequences of course acceleration are minimal.

Introduction

The relationship between course length and student achievement has received considerable attention at the undergraduate level (Van Scyoc and Gleason 1993, Daniel 2000, Seamon 2004, Austin and Gustafson 2006). Accelerating or condensing courses (often during summer break) offers students the opportunity to intensify their focus on a reduced number of courses, to reinforce previously-introduced material that might otherwise be forgotten over an extended break, and to shorten the period between the introduction of new concepts and their subsequent application. Accelerating the curriculum, though, is not without risk. The shortened time span of a given course may fail to allow sufficient time to internalize complex concepts (Tracey, Sedlacek, and Patterson 1980, Petrowsky 1996). Furthermore, when condensed courses represent the lion's share or the entirety of a program of study—especially those programs targeting older students—the growing demands of established families and careers compete with the rigors of accelerated coursework (Smith 1988). Finally, the intense focus required to master material at an accelerated pace may not be sustainable over a prolonged period.

For institutions seeking to build enrollment, students' attraction to accelerated courses and programs represents a potentially powerful recruiting tool (Caskey 1994). Accrediting bodies increased emphasis on and scrutiny of outcomes (e.g., AACSB 2010, p. 68), however, may temper institutional support for such programs if they negatively impact learning outcomes.

This paper is a case study of this relationship between an accelerated class format and student achievement at the graduate level—specifically, among MBAs in their required, core microeconomics class. A pre- and post-test design is used to measure student achievement in both traditional, 16-week sections and accelerated, eight-week sections. Following this introduction, we describe the program, course, and test considered. An overview of the data, the statistical analysis, and conclusions follow. Our findings suggest course acceleration yields a statistically significant reduction in student achievement; however, the gap is small—roughly one question on the 32-item exam. Thus, the practical consequence is minimal and most likely justified if accelerated formats afford students educational opportunities they would not otherwise have.

Program, Course, and Test Description

The MBA program considered in this study requires 30 semester hours with an additional three hours required for students without an undergraduate business degree or its equivalent. The core (representing 18 hours) includes the economics course of interest in this study as well as one class each in accounting, finance, management, marketing, and organizational behavior. An additional four electives completes the program. If after nine hours a student has less than a 3.0 GPA, they are placed on academic probation; if after an additional nine hours the GPA is not raised to 3.0, the student is dismissed from the program.

The MBA microeconomics class combines elements of microeconomic principles, intermediate microeconomics, and statistics. Principles of microeconomics or macroeconomics as well as introductory statistics are the listed prerequisites. Baye's text (2010) would be a comparable guide in terms of level of difficulty and coverage. Specific topics include consumer theory, supply and demand analysis, elasticities, the theory of the firm, production and cost functions, profit maximization under various market structures, and input demand. Instruction is mostly lecture, and coursework includes short in-class exercises, more extensive problem sets, and a midterm and final exam. An instructor or teaching assistant grades all work assigned. Grades are based on a weighted average of the various assignments with the problem set average weighted 20 percent, 40 percent assigned to the midterm, 40 percent assigned to the final, and the daily exercises averaged and incorporated as one datum in the calculation of the problem set average. Traditional, 16-week sections either meet for 150 minutes once a week (Spring 2009) or for 75 minutes twice a week (Spring 2010). Accelerated, eight-week sections meet once weekly for four hours and forty-five minutes.

The pre-test and post-test instrument is a multiple choice exam containing 32 items. As does Caviglia-Harris (2004), we employ a test tailored to the class material, rather than a standardized test such as the Test of Understanding in College Economics (TUCE), as a better gauge of student achievement over this specific material (McCoy et al. 1994). A course-specific test allows us to add questions central to managerial decision-making and leave out peripheral topics that a standardized test such as the TUCE might include. At 32 items, the exam's length falls within the 25 to 40 item range Becker cites as yielding a valid and reliable test for a 50 to 75 minute testing period (Becker 1997, p.1366).

Data Description

The data consist of 139 observations pooled from four sections of the MBA core microeconomics class taught Spring Semester 2009 and Spring and Summer Semester 2010. All sections were taught by the same instructor at a regional comprehensive university in the Southeastern United States. Each observation describes one student and contains an identifier, ID, as well as variables describing individual characteristics and aptitudes, coursework scores, and class characteristics.

Variables Describing Individual Characteristics

The variables describing individual characteristics and aptitudes include GENDER (coded one for males, zero for females) and TGMAT, a subject's Total GMAT score, which may range from 200 to 800. For those taking the test more than once, TGMAT reports the average Total GMAT score. LOAD contains the summed semester hours for courses taken during the same semester as economics. Progress toward degree is represented by PREHRS, the semester hours a student had completed prior to taking economics.

Variables Describing Class Work

Class work consisted of several types of assignments.

Pre-test and Post-test - PRETEST is the number of questions answered correctly on the pre-test. It is integer-valued, ranging from zero to 32. Post-test performance is indicated by POSTTEST, which is also integer-valued and ranges from zero to 32. Two test forms, A and B, were administered for both the pre-test and post-test. A random draw determined which pre-test form a subject received, which is indicated by the dummy PREFRMB (coded one for Form B, zero for Form A). An indicator for post-test form, POSTFRMB, is coded one for those receiving Form B for the post-test and zero otherwise.

Midterm - The midterm exam (MIDTERM) covers the first half of the class. Typical topics include economic versus accounting profit, the time value of money, supply and demand analysis, elasticities, and regression analysis. The test format includes a mix of short answer and fill-in-the-blank questions; potential scores range from zero to 100.

Problem Sets - Four problem sets were assigned to each section. Each problem set consists of several questions designed to reinforce the lectures, and the questions themselves are similar to the end-of-chapter questions as might be found in a standard managerial economics text (e.g., Baye 2010). Problem sets were assigned at the end of the corresponding lecture, collected either via email or during the following class session, graded by the instructor or a teaching assistant, and returned and reviewed the following class period. The grading scale ranges from zero to 100. Problem Set 1 (PS1) covers the time value of money, net present value, marginal analysis, and economic versus accounting profit. Problem Set 2 (PS2) deals with market analysis using the supply/demand model, while Problem Set 3 (PS3) covers elasticities. Problem Set 4 (PS4) covers regression analysis.

In-class assignments - A number of in-class problems were assigned on a pass/fail basis. These include EX_1_6, a demand modeling exercise focused on distinguishing movements along a demand curve from shifts of the curve; EX_2_2, a supply exercise similar in structure to EX_1_6; and EX_3_1, an arc elasticity exercise. For those completing the exercise, the corresponding variable is coded one; zero if otherwise.

Variables Describing Class Characteristics

The data also include several class descriptors. Eight-week sections are distinguished from 16-week sections with the dummy ACCEL, coded one for eight-week sections and zero for 16-week ones. For classes held during the 2009 academic year, the dummy variable AY2009 is coded one; 2010 classes are coded zero. To measure interaction effects between ACCEL and AY2009 (i.e., class characteristics specific to the 2009 accelerated section), INTERACT was created by multiplying ACCEL times AY2009.

In Table 1 below, the mean, standard deviation, minimum, maximum and number of observations for each variable are shown.

Table 1
Descriptive Statistics

Variable	Mean	Std. Dev.	Minimum	Maximum	N
POSTTEST	26.043	3.732	18.0	32.0	139
ACCEL	.439	.498	0.0	1.0	139
AY2009	.590	.494	0.0	1.0	139
EX_1_6	.957	.204	0.0	1.0	139
EX_2_2	.971	.168	0.0	1.0	139
EX_3_1	.950	.219	0.0	1.0	139
GENDER	.540	.500	0.0	1.0	139
INTERACT	.281	.451	0.0	1.0	139
LOAD	4.374	2.435	0.0	12.0	139
MIDTERM	87.650	10.932	46.7	100.0	139
POSTFRMB	.475	.501	0.0	1.0	139
PREFRMB	.475	.501	0.0	1.0	139
PREHRS	13.388	11.931	0.0	104.0	139
PRETEST	18.719	3.888	7.0	29.0	139
PS1	87.210	13.484	40.0	100.0	139
PS2	83.523	18.598	0.0	101.0	139
PS3	96.245	8.326	48.0	100.0	139
PS4	81.278	15.095	0.0	100.0	139
TGMAT	456.819	76.266	270.0	700.0	120

Statistical Analysis and Results

A preliminary, but reasonable, question would be “Did each class exhibit statistically significant gains from the pre-test to the post-test?” To address this question, the difference (DIFF) between the number correct on the post-test and pre-test was computed, i.e., for observation *i*, $DIFF_i = POSTTEST_i - PRETEST_i$. For example, a student scoring 16 of 32 on the pre-test and 25 of 32 on the post-test would yield a difference of 25 - 16 = +9. In Table A1 in the Appendix we report the frequencies of this difference by course section. Next, a non-parametric Wilcoxon signed rank test was applied to each section’s data from Table A1 to test the null, H_o: $E(POSTTEST_i) \leq E(PRETEST_i)$, against the alternative, H_a: $E(POSTTEST_i) > E(PRETEST_i)$ for all *i*. The test statistic, *T*, is approximately normally distributed with large values favoring the alternative hypothesis (Conover 1980, p. 282). The observed value for the 2009 16-week section is 5.705 (p-value = .000). For the other three sections, the test statistics and corresponding p-values (in parentheses) are: 2009 eight-week section, T = 5.448 (p-value = .000), 2010 16-week section, T = 5.169 (p-value = .000), and 2010 eight-week section, T = 3.851 (p-value = .000). As the observed gains are statistically significant for all four sections, it is fairly certain that each class taken as a whole performed better on the post-test than the pre-test.

Modeling Framework

To address the primary question—the relationship between course acceleration and student achievement—Davisson and Bonello's taxonomy was followed (as described in Becker (1983)). Let A_{ij} represent attainment by student *i* in class *j*. H_i represents a vector of student attributes which might broadly be described as human capital. E_{ij} is the effort of student *i* in class *j*. T_j is the technology employed to deliver class *j*, and

$$A_{ij} = A_{ij}(H_i, E_{ij}, T_j) \quad (1)$$

is the corresponding reduced form production function.

Attainment (A) is measured with the variable POSTTEST, the number correct on the post-test. Two variables—PRETEST and TGMAT—represent human capital (H), with PRETEST serving as proxy for course-specific knowledge and TGMAT representing general aptitude for business studies. Both were expected to exert a positive influence on POSTTEST. Effort (E) might also be expected to positively influence POSTTEST and is represented by the four problem sets (PS1, PS2, PS3, and PS4), three in-class exercises (EX_1_6, EX_2_2, and EX_3_1), and the midterm (MIDTERM). LOAD, however, represents competing demands for effort. Thus, it is hypothesized that LOAD negatively influences POSTTEST. The primary focus of the study, the effect of class acceleration on achievement, is represented by ACCEL. For a time-stressed population such as the MBAs studied here, course acceleration represents a reduction in cognitive resources and so it is hypothesized that ACCEL negatively affects POSTTEST. Directionality of the control variables AY2009, GENDER, INTERACT, POSTFRMB, PREFRMB, and PREHRS is not predicted.

Statistical Analysis

GMAT scores are not available for nineteen of the 139 observations in the sample, leaving 120 usable observations. For comparison to Table 1, summary statistics of the remaining observations are reported in Appendix Table A2. For each ordinal, interval or ratio variable, a Mann-Whitney test was performed to detect differences between the distribution function underlying the deleted observations and the one underlying the remaining sample. For nominal variables a χ^2 test of independence was employed. None of these tests revealed significant differences at the .05 level.

To check whether students self-selected into an accelerated class based on ability, accelerated classes' students were pooled into one group, 16-week classes' students pooled into another group, and a second series of Mann-Whitney tests was conducted. The null hypothesis test is that the same distribution underlies both groups' TGMAT scores (versus the alternative hypothesis that the two distributions differ). The test statistic is standard normally distributed (Conover 1980, pp. 216-218). The observed value, 1.143, yields a *p*-value of .253 (for a two-tailed test). A similar procedure for PRETEST produces an observed value of .019 and *p*-value of .985. These findings are not consistent with self-selection based on TGMAT or PRETEST.

Shown below in the second and third columns of Table 2 are OLS regression results modeling POSTTEST as a linear function of a constant and the full set of variables described above (Model 1). Shown in the second column of Table 2 are each explanatory variable's estimated coefficient with the corresponding standard error below in parentheses; in the third column of Table 2 is shown the corresponding *t*-ratio and, located below the *t*-ratio in parentheses, the *p*-value of the two-tailed null hypothesis that the estimated coefficient is zero. Also shown are a number of goodness-of-fit and diagnostic measures for each model in column 2 at the bottom of Table 2. These include R^2, the Akaike Information Criterion (AIC) (Akaike 1981), the Breusch-Pagan test for heteroscedasticity, and the *F*-statistic. Adjusted R^2 and the *p*-values of the Breusch-Pagan test and *F*-statistic are located in parentheses to their right in column three.

Table 2
OLS Regression Results for Dependent Variable POSTTEST

Variable	Model 1		Model 2		Model 3	
	Coefficient (S.E.)	*t*-ratio (*p*-value)	Coefficient (S.E.)	*t*-ratio (*p*-value)	Coefficient (S.E.)	*t*-ratio (*p*-value)
Constant	5.076 (5.208)	.975 (.332)	6.785 (2.890)	2.348 (.021)	6.361 (2.861)	2.223 (.028)
ACCEL	-1.169 (1.179)	-.991 (.324)	-.837 (.567)	-1.477 (.143)	-.952 (.556)	-1.714 (.089)
AY2009	-.091 (.886)	-.103 (.918)	-----	-----	-----	-----
EX_1_6	-.145 (1.394)	-.104 (.918)	-----	-----	-----	-----
EX_2_2	.232 (2.022)	.115 (.909)	-----	-----	-----	-----
EX_3_1	-1.080 (1.322)	-.817 (.416)	-----	-----	-----	-----
GENDER	.491 (.602)	.815 (.417)	-----	-----	-----	-----
INTERACT	.626 (1.410)	.444 (.658)	-----	-----	-----	-----
LOAD	-.038 (.157)	-.243 (.809)	-----	-----	-----	-----
MIDTERM	.091 (.032)	2.887 (.005)	.095 (.028)	3.437 (.001)	.096 (.028)	3.461 (.001)
POSTFRMB	-.340 (.668)	-.508 (.613)	-----	-----	-----	-----
PREFRMB	-.134 (.656)	-.205 (.838)	-----	-----	-----	-----
PREHRS	-.041 (.036)	-1.153 (.252)	-.034 (.033)	-1.036 (.302)	-----	-----
PRETEST	.199 (.091)	2.179 (.032)	.202 (.084)	2.405 (.018)	.213 (.084)	2.544 (.012)
PS1	.001 (.025)	.024 (.981)	-----	-----	-----	-----
PS2	.007 (.019)	.402 (.689)	-----	-----	-----	-----
PS3	.027 (.045)	.611 (.543)	-----	-----	-----	-----
PS4	.065 (.020)	3.239 (.002)	.068 (.018)	3.763 (.000)	.068 (.018)	3.766 (.000)
TGMAT	.006 (.005)	1.267 (.208)	.005 (.004)	1.323 (.189)	.005 (.004)	1.223 (.224)
R^2 (Adj. R^2)	.361	(.248)	.349	(.314)	.342	(.314)
AIC	5.247	-----	5.067	-----	5.060	-----
Breusch-Pagan	9.346	(.951)	1.471	(.961)	1.262	(.939)
F-statistic	3.18	(.000)	10.08	(.000)	11.88	(.000)

While the *F*-statistic of Model 1 (F = 3.08 and *p*-value = .000) leads to the rejection of the null hypothesis that the estimated coefficients (excluding the constant) are jointly zero, the gap between the model's R^2 (.361) and adjusted R^2 (.248) suggests an over-specified model, a critical point given Becker's concerns about degrees of freedom and statistical significance in similar studies (Becker 1997, pp. 1366-1367).

Model 2, reported in columns four and five of Table 2, results from repeating the analysis while removing the variables AY2009, EX_1_6, EX_2_2, EX_3_1, GENDER, INTERACT, LOAD, POSTFRMB, PREFRMB, PS1, PS2, and PS3. Model 2's *F*-statistic indicates this reduced form model is significant (F = 10.08, *p*-value = .000); moreover, goodness-of-fit is improved. Adjusted R^2 has increased from .249 to .314, and the Akaike Information Criterion (AIC) has decreased from 5.247 to 5.067 (Akaike 1981). As a check of the deleted variables' failure to affect POSTTEST, a likelihood ratio test yields an observed value of 2.367. This falls short of the critical value at the .05 level of 21.03 (from the χ^2 distribution with 12 degrees of freedom) and leads us to fail to reject the null that the estimated coefficients of the deleted variables jointly equal zero.

Model 3 results from removing PREHRS from Model 2. Like both Models 1 and 2, Model 3's *F*-statistic indicates a significant model (F = 11.88, *p*-value = .000). It represents a slight improvement in goodness-of-fit over Model 2, with the same adjusted R^2 but a lower AIC (5.060 versus 5.067 for Model 2). A likelihood ratio test of the null hypothesis that PREHRS's estimated coefficient is zero yields an observed value of 1.134 with corresponding *p*-value of 0.287. Consequently, Model 3 is considered the best fit.

As a prelude to testing hypotheses concerning individual variables' estimated coefficients, a Breusch-Pagan heteroscedasticity test was conducted (Breusch and Pagan 1979). The variance of observation i is modeled as a function of a vector of explanatory variables, z_i:

$$\sigma_i^2 = \sigma^2 f(\alpha_0 + \alpha' z_i). \quad (2)$$

In the case of Model 3, z includes all five explanatory variables: ACCEL, MIDTERM, PRETEST, PS4, and TGMAT. The observed value is 1.262, which yields a *p*-value of .939 based on the χ^2 distribution with five degrees of freedom; consequently, the null hypothesis of homoscedasticity cannot be rejected for any reasonable level of significance.

Turning to hypotheses concerning individual regressors, the *p*-values reported in Table 2 represent two-tailed tests. To compute *p*-values appropriate for the one-tailed tests directional hypotheses require, the *p*-value reported in Table 2 must be halved.Consider Model 3. A positive relationship was predicted between the dependent variable, POSTTEST, and MIDTERM (estimated coefficient = .096, adjusted *p*-value = .001), PRETEST (estimated coefficient = .213, adjusted *p*-value = .006), PS4 (estimated coefficient = .068, adjusted *p*-value = .000) and TGMAT (estimated coefficient = .005, adjusted *p*-value = .112). A negative relationship was predicted between POSTTEST and ACCEL (estimated coefficient = -.952, adjusted *p*-value = .045). These statistical findings are consistent with each of the predicted relationships and significant at the .05 level with the exception of TGMAT.

Conclusions

The findings of this study are broadly consistent with the educational production function framework presented in Equation 1. At least one variable representing each of the three educational factors of production—human capital (H), effort (E), and technology (T)—exhibits a statistically significant relationship in the expected direction at the .05 level. Addressing the focal question of this study, the relationship between an accelerated course format and student achievement, the findings of this study indicate course acceleration decreases achievement. However, the resulting decrease is a small one with little practical impact. Applying the grading criteria described above to the mean scores reported in Table A2, the “average” student would earn a letter grade of “B” based on a cumulative average of 85.4. According to Model 3, the accelerated class format decreases post-test scores by .952 questions on the 32-item test, reducing the average post-test score from 81.6 to 78.7 and the resulting cumulative average from 85.4 to 84.2. The corresponding letter grade, however, remains unchanged: a “B”.

Admittedly, the pre- and post-test design employed is by no means novel; however, the data generated by this study does have a number of attractive features. It can reasonably be claimed that both pre-test and post-test scores represent motivated behavior. One of Becker’s (1997) critiques of previous pre- and posttest studies based on the TUCE is “students do not take the test seriously when it does not count in the course grade.” (pp. 1364-1365). It certainly seems reasonable for undergraduates without prior exposure to economics to consider the TUCE—a two-part test with 66 items evenly split between micro and macroeconomics—an unreasonable first day exercise. Such a test might hold greater credibility among graduate students for whom macro or microeconomics is both a program and course prerequisite, as is the case in this study. Moreover, the pre-test counts. It is recorded as one of several problem sets whose average comprises 20 percent of the overall course grade. Students are allowed to drop their lowest problem set score—which may be the pre-test or any one of the other assigned problem sets—from the grade calculation. Therefore, performing poorly on the pre-test potentially exhausts the possibility of dropping a later, low score. The post-test is the course final exam, weighted 40 percent of the overall grade.

Another of Becker's critiques of pre- and post-test studies is withdrawals can induce sample bias—namely, those anticipating low scores drop out, biasing estimates of class gains. In the data analyzed here, only 5 of 122 students (4.1 percent) either withdrew or failed to take both pre-test and post-test. In the 16-week 2009 section, two students were unable to take the pre-test due to visa or travel difficulties, but subsequently took the post-test and passed the class. One student withdrew after taking both the pre-test and midterm and, thus, did not take the post-test. These three lost observations represent 6.5 percent of the section's initial enrollment. Of the other sections, one of 40 students (2.5 percent) withdrew from the 2009 accelerated section, and one of 36 (2.8 percent) withdrew from the 2010 16-week section. None withdrew from the 2010 accelerated section. Neither the total withdrawals from all sections or those for any individual class approach the problematic 20 to 40 percent rates Becker cites (1997).

As to the rationale underlying the contrast between the findings of this study—reduced achievement in accelerated courses—and undergraduate studies finding a positive relationship (e.g., Van Scyoc and Gleason 1993), the bounded rationality literature offers a possible explanation. If, as Babcock and Marks (2010) report, undergraduates have reduced weekly study time since 1961 from 24 to 14 hours and reallocated the 10 hour difference to leisure, then undergraduates would have a pool of time that could be applied to the added challenge of accelerated courses. The graduate MBAs considered by this study, with full-time careers and family obligations, are less likely to have such a pool of time which could be readily reallocated to meet the increased demands of accelerated courses. Combined with the added difficulty inherent in coursework at the graduate level, a performance-degrading competence-difficulty gap (Heiner 1983) would be more likely for the overbooked MBA.

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Table A1
Frequencies of Individual Differences between Post- and Pre-test (by Section)*

	Difference = POSTTEST – PRETEST																				
Section	-4	-3	-1	+2	+3	+4	+5	+6	+7	+8	+9	+10	+11	+12	+13	+14	+15	+16	+17	+18	+19
2009 16-Week	0	1	0	0	0	5	2	4	5	5	5	2	1	4	2	2	2	1	0	1	1
2009 8-Week	0	0	0	4	1	5	2	2	5	3	4	3	3	4	1	0	0	2	0	0	0
2010 16-Week	0	0	0	2	3	1	1	3	4	4	5	7	1	2	1	0	1	0	0	0	0
2010 8-Week	1	0	2	1	0	2	3	2	2	0	1	3	1	1	0	2	0	0	1	0	0

**Notes*: Frequencies represent the number of students in a given section exhibiting difference indicated in column heading. For 2009 16-week section the mean difference is +9.00 and the median difference is +8. For the 2009 8-week section the mean difference is +7.79 and the median difference is +8. The corresponding means and medians for the 2010 16-week and 8-week sections are, respectively, mean = 7.94 and median = 8 and mean = 6.91 and median = 6.5.

Table A2
Descriptive Statistics for Final Sample

Variable	Mean	Std. Dev.	Minimum	Maximum	N
POSTTEST	26.125	3.578	18.0	32.0	120
ACCEL	.417	.495	0.0	1.0	120
AY2009	.592	.494	0.0	1.0	120
EX_1_6	.950	.219	0.0	1.0	120
EX_2_2	.975	.157	0.0	1.0	120
EX_3_1	.942	.235	0.0	1.0	120
GENDER	.533	.501	0.0	1.0	120
INTERACT	.275	.448	0.0	1.0	120
LOAD	4.450	2.365	0.0	9.0	120
MIDTERM	87.593	10.640	49.100	100.000	120
POSTFRMB	.483	.502	0.0	1.0	120
PREFRMB	.492	.502	0.0	1.0	120
PREHRS	12.225	8.620	0.0	30.0	120
PRETEST	18.758	3.733	7.0	26.0	120
PS1	87.042	13.491	40.0	100.0	120
PS2	82.619	19.129	0.0	101.0	120
PS3	96.517	7.536	60.0	100.0	120
PS4	80.930	15.150	0.0	100.0	120
TGMAT	456.819	76.266	270.0	700.0	120